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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/675,587	09/29/2003	Theodore Doros	42P16636	9936

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EXAMINER	
TRINH, MICHAEL MANH	
ART UNIT	**PAPER NUMBER**
2822	

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/675,587	DOROS ET AL.	
	Examiner	Art Unit	
	Michael Trinh	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) *23-25* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/31/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

*** This office action is in response to Applicant's election filed on April 25, 2005. Claims 1-25 are pending, in which claims 23-25 are non-elected without traverse.

Election/Restrictions

1. Claims 23-25 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made without traverse in Paper mail date April 25, 2005.

Claim Rejections - 35 USC § 112

2. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Scope of claim 15 is contradictory and indefinite, since base claim 14 recites "a photosensitive polymer disposed on the sacrificial layer, but dependent claim 15 differently recites "a non-polymer photoresist disposed on the sacrificial layer".

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

4. Claims 1-4 are rejected under 35 U.S.C. 102(b)as being anticipated by Schiltz et al (6,387,808).

Schiltz teaches a method comprising: forming a layer 16/20 material on a silicon wafer 10(Fig 2a,col 2, lines 33-67; Fig 5a, col 5, line 5-67), the silicon wafer 10 having variations in surface topology comprising at least one thick region and at least one thin region, the layer 20/16 of material having variations in surface topology comprising at least one thick regions and at least one thin region corresponding to the thick regions and the thin regions of the wafer 10, respectively; and forming at least one narrow region and at least one wide region in the layer 20/16 of material, the narrow regions (narrow region 21 in Fig 2b; and 202 in Fig 5b) and the wide regions (wider region 21 in Fig 2b; and wider region 204 in Fig 5b) corresponding to the thick regions and the thin regions of the wafer 10, respectively. Re claim 2, wherein the method includes exposing photoresist photosensitive resin 20 disposed on the layer 16 of material to light through a mask 22 (Fig 2a; col 2, lines 41-47; line 64 through col 3; col 3, lines 41-50) having a pattern to which near-resolution marks 24 have been added; and removing portions of the layer 16/20 of material to leave the narrow regions and the wide regions (narrow region 21 in Fig 2b; and 202 in Fig 5b; and wider region 21 in Fig 2b; and wider region 204 in Fig 5b). Re claim 3, wherein the method comprises characterizing the thick regions of the wafer as first zones; characterizing the thin regions of the wafer as second zones; and forming the narrow regions in the first zones and the wide regions in the second zones (col 2, lines 20-25; col 5, lines 1-25; Figs 1; 2a-2c;5a-5c). Re claim 4, wherein the method comprises setting first imaging compensation for the first zones and second imaging compensation for the second zones (col 1, lines 26-33; Figs 1; 2a-2c;5a-5c; col 2, lines 20-25; col 5, lines 1-25); and removing areas of the layer 16/20 of material to leave the narrow regions in the first zones and the wide regions in the second zones (narrow region 21 in Fig 2b; and 202 in Fig 5b; and wider region 21 in Fig 2b; and wider region 204 in Fig 5b).

5. Claims 1,3 are rejected under 35 U.S.C. 102(b)as being anticipated by Lee (DE 43 39366 A1).

Lee teaches a method comprising: forming a layer 13 material on a silicon wafer 12/11 (Fig 2a), the silicon wafer 12/11 having variations in surface topology comprising at least one thick region II.and at least one thin region III, the layer 20/16 of material having variations in surface topology comprising at least one thick regions and at least one thin region corresponding

to the thick regions and the thin regions of the wafer 12/11, respectively; and forming at least one narrow region and at least one wide region in the layer 13 of material (Fig 2b), the narrow regions and the wide regions corresponding to the thick regions and the thin regions of the wafer 12/11 (Fig 2b-2c), respectively. Re claim 3, wherein the method comprises characterizing the thick regions of the wafer as first zones II (Fig 2a-2c); characterizing the thin regions of the wafer as second zones III (Fig 2a-2c); and forming the narrow regions in the first zones and the wide regions in the second zones (Figs 2b-2c).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schiltz et al (6,387,808) taken with Ledger (5,502,564).

Schiltz teaches a method as applied above to claims 1-4, wherein there is an unevenness of substrate topography, and wherein the method comprises forming at least one narrow region and at least one wide region in the layer 20/16 of material, the narrow regions (narrow region 21 in Fig 2b; and 202 in Fig 5b) and the wide regions (wider region 21 in Fig 2b; and wider region 204 in Fig 5b) corresponding to the thick regions and the thin regions of the wafer 10, respectively

Re claim 5, Schiltz lacks mapping to determine the thick and thin regions. Re claim 6, wherein the mapping is ellipsometric, laser, or capacitance.

However, Ledger teaches determining and measuring variation of wafer thickness by mapping the substrate surface (col 1, lines 7-10; col 10, lines 18-32; col 7, lines 30-31; Figs 1-8), wherein the mapping techniques includes ellipsometric mapping (at Fig 1; col 7, lines 60-63; col 8, lines 1-4), laser mapping (col 8, lines 26-29); and capacitance mapping (col 1, lines 56-59).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to carry out the method of Schiltz to determine the thick and thin regions by mapping the substrate surface, wherein techniques for mapping includes ellipsometric, laser, or capacitance, as taught by Ledger. This is because of the desirability to precisely determine the locations of thick and thin regions on the wafer so that narrow and wide regions can be correspondingly and precisely formed respectively thereon.

8. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schiltz et al (6,387,808) taken with Kozhukh (6,437,903).

Schiltz teaches a method as applied above to claims 1-4, and fully incorporated herein.

Schiltz thus lacks mentioning a machine-accessible medium including data that, when accessed by a machine, cause the machine to perform the methods of claims 1-4 above.

However, Kozhukh teaches (at col 6, lines 58-61; col 4, lines 10-45) about employing a machine-accessible medium including data that, when accessed by a machine, cause the machine to perform the methods.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to store the methods of Schiltz in a machine-accessible medium, as taught by Kozhukh so that when accessed by a machine, cause the machine to perform the stored methods in an automatic manner.

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schiltz et al (6,387,808) and Kozhukh (6,437,903), as applied to claims 7-10, and further of Ledger (5,502,564).

Schiltz and Kozhukh teaches a method as applied to claims 7-10 above, wherein Kozhukh teaches (at col 6, lines 58-61; col 4, lines 10-45) about employing a machine-accessible medium including data that, when accessed by a machine, cause the machine to perform the methods, and wherein Schiltz teaches an unevenness of substrate topography and a method comprises forming at least one narrow region and at least one wide region in the layer 20/16 of material, the narrow regions (narrow region 21 in Fig 2b; and 202 in Fig 5b) and the wide regions (wider region 21 in Fig 2b; and wider region 204 in Fig 5b) corresponding to the thick regions and the thin regions of the wafer 10, respectively

Re claim 11, the references including Schiltz lack mapping to determine the thick and thin regions.

However, Ledger teaches determining and measuring variation of wafer thickness by mapping the substrate surface (col 1, lines 7-10; col 10, lines 18-32; col 7, lines 30-31; Figs 1-8), wherein the mapping techniques includes ellipsometric mapping (at Fig 1; col 7, lines 60-63; col 8, lines 1-4), laser mapping (col 8, lines 26-29); and capacitance mapping (col 1, lines 56-59).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to carry out the method of Schiltz to determine the thick and thin regions by mapping the substrate surface, as taught by Ledger. This is because of the desirability to precisely determine the locations of thick and thin regions on the wafer so that narrow and wide regions can be correspondingly and precisely formed respectively thereon.

10. Claims 12,13,16,17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schiltz et al (6,387,808) taken with Van Der Plas (5,015,602) and Atkinson (5,155,053).

Schiltz teaches a method comprising: forming a layer 16/20 material on a silicon wafer 10(Fig 2a,col 2, lines 33-67; Fig 5a, col 5, line 5-67), the silicon wafer 10 having variations in surface topology comprising at least one thick region and at least one thin region, the layer 20/16 of material having variations in surface topology comprising at least one thick regions and at least one thin region corresponding to the thick regions and the thin regions of the wafer 10, respectively; and forming at least one narrow region and at least one wide region in the layer 20/16 of material, the narrow regions (narrow region 21 in Fig 2b; and 202 in Fig 5b) and the wide regions (wider region 21 in Fig 2b; and wider region 204 in Fig 5b) corresponding to the

thick regions and the thin regions of the wafer 10, respectively, wherein the method includes exposing photoresist photosensitive resin 20 disposed on the layer 16 of material to light through a mask 22 (Fig 2a; col 2, lines 41-47; line 64 through col 3; col 3, lines 41-50) having a pattern to which near-resolution marks 24 have been added; and removing portions of the layer 16/20 of material to leave the narrow regions and the wide regions (narrow region 21 in Fig 2b; and 202 in Fig 5b; and wider region 21 in Fig 2b; and wider region 204 in Fig 5b). Re claim 16, wherein the method comprises characterizing the thick regions of the wafer as first zones; characterizing the thin regions of the wafer as second zones; and forming the narrow regions in the first zones and the wide regions in the second zones (col 2, lines 20-25; col 5, lines 1-25; Figs 1; 2a-2c;5a-5c). Re claim 17, wherein the method comprises setting first imaging compensation for the first zones and second imaging compensation for the second zones (col 1, lines 26-33; Figs 1; 2a-2c;5a-5c; col 2, lines 20-25; col 5, lines 1-25); and removing areas of the layer 16/20 of material to leave the narrow regions in the first zones and the wide regions in the second zones (narrow region 21 in Fig 2b; and 202 in Fig 5b; and wider region 21 in Fig 2b; and wider region 204 in Fig 5b).

Re claim 12, Schiltz lacks forming a sacrificial layer on the first layer, and lacks using direct write of a pattern on photoresist. Re further claim13, wherein direct writing uses electron beam, ultraviolet light, x-rays, or optical beam.

However, Van Der Plas teach (at Figs 9-11) forming a plurality of layers on the silicon wafer, wherein the plurality of layers includes a sacrificial layer 15 formed on a first layer 20/18, and wherein the sacrificial layer has a variations in surface topology comprising a thick and thin regions corresponding to the thick and thin regions of the first layer 18/20, respectively. Atkinson teaches (at Figs 19-22; col 9, lines 17-30) to form a pattern having small and near-resolution limit by direct writing on a photoresist 60, wherein, re further claim 13, the direct writing uses electron beam, ultraviolet light, x-rays, or optical beam (col 9, lines 17-25).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the device structure of Schiltz by forming a plurality of layers on the silicon wafers, wherein the plurality of layers includes a sacrificial layer formed on a first layer, as taught by Van Der Plas. This is because of the desirability to form an etch stop layer on the first layer so that the layer can be etched in an selective manner. Additionally, the subject matter

as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to form a pattern in the first layer of Schiltz by direct writing on a photoresist layer formed on the first layer, as taught by Atkinson, in which the direct writing uses electron beam, ultraviolet light, x-rays, or optical beam (col 9, lines 17-25). This is because of the desirability to form a small and near-resolution pattern on the silicon wafer, wherein processing steps and cost are reduced since it is directly written on the photoresist by directly irradiating electron beam, ultraviolet light, x-rays, or optical beam, without using a photomask.

11. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schiltz et al (6,387,808) taken with Van Der Plas (5,015,602) and Atkinson (5,155,053), as applied to claims 12,16,17 above, and further of Banks et al (5,112,440).

The references including Schiltz, Van Der Plas, and Atkinson teaches a method as applied to claims 12,16 and 17 above.

The combined references teach a photoresist, but lack mentioning a photosensitive polymer (claim 14) or a non-polymer photoresist (claim 15).

However, Banks teaches (at col 5, lines 19-21) patterning a layer by using a photoresist material, wherein the photoresist includes conventional photosensitive and non-photosensitive polymers.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the pattern of the references including Schiltz by employing a photoresist material including conventional photosensitive and non-photosensitive polymers, as taught by Banks. This is because photosensitive and non-photosensitive polymers are alternative and art recognized equivalent materials for forming a photoresist so that small and near-resolution pattern can be effectively formed.

12. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schiltz et al (6,387,808) taken with Van Der Plas (5,015,602) and Atkinson (5,155,053), as applied to claims 12,13,16,17 above, and further of Ledger (5,502,564).

The references including Schiltz, Van Der Plas, and Atkinson teach a method as applied to claims 12,13, 16 and 17 above, wherein Schiltz teaches an unevenness of substrate topography

and a method comprises forming at least one narrow region and at least one wide region in the layer 20/16 of material, the narrow regions (narrow region 21 in Fig 2b; and 202 in Fig 5b) and the wide regions (wider region 21 in Fig 2b; and wider region 204 in Fig 5b) corresponding to the thick regions and the thin regions of the wafer 10, respectively.

Re claim 18, the references including Schiltz lack determining the thick and thin regions by mapping the substrate surface.

However, Ledger teaches determining and measuring variation of wafer thickness by mapping the substrate surface (col 1, lines 7-10; col 10, lines 18-32; col 7, lines 30-31; Figs 1-8), wherein the mapping techniques includes ellipsometric mapping (at Fig 1; col 7, lines 60-63; col 8, lines 1-4), laser mapping (col 8, lines 26-29); and capacitance mapping (col 1, lines 56-59).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to carry out the method of the references including Schiltz to determine the thick and thin regions by mapping the substrate surface, as taught by Ledger. This is because of the desirability to precisely determine the locations of thick and thin regions on the wafer so that narrow and wide regions can be correspondingly and precisely formed respectively thereon.

13. Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schiltz et al (6,387,808) taken with Van Der Plas (5,015,602) and Atkinson (5,155,053), as applied to claims 12,13,16 and 17 above, and further of Kozhukh (6,437,903).

The references including Schiltz, Van Der Plas, and Atkinson teach a method as applied to claims 12,13,16 and 17 above.

The references thus lack mentioning a machine-accessible medium including data that, when accessed by a machine, cause the machine to perform the methods.

However, Kozhukh teaches (at col 6, lines 58-61; col 4, lines 10-45) about employing a machine-accessible medium including data that, when accessed by a machine, cause the machine to perform the methods.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to store the methods of the references including Schiltz in a machine-accessible medium, as taught by Kozhukh so that when accessed by a machine, cause the machine to perform the stored methods in an automatic manner.

14. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schiltz (6,387,808) taken with Van Der Plas (5,015,602), Atkinson (5,155,053), and Banks (5,112,440), as applied to claims 14-15 above, and further of Kozhukh (6,437,903).

The references including Schiltz, Van Der Plas, Atkinson, and Banks teach a method as applied to claims 14-15 above.

The references thus lack mentioning a machine-accessible medium including data that, when accessed by a machine, cause the machine to perform the methods.

However, Kozhukh teaches (at col 6, lines 58-61; col 4, lines 10-45) about employing a machine-accessible medium including data that, when accessed by a machine, cause the machine to perform the methods.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to store the methods of the references including Schiltz in a machine-accessible medium, as taught by Kozhukh so that when accessed by a machine, cause the machine to perform the stored methods in an automatic manner.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael M. Trinh whose telephone number is (571) 272-1847. The examiner can normally be reached on M-F: 8:30 Am to 5:00 Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist whose telephone number is (703) 308-0956.

Oacs-17

Michael Trinh
Primary Examiner